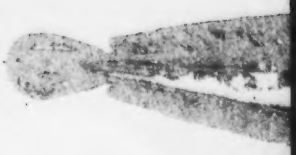

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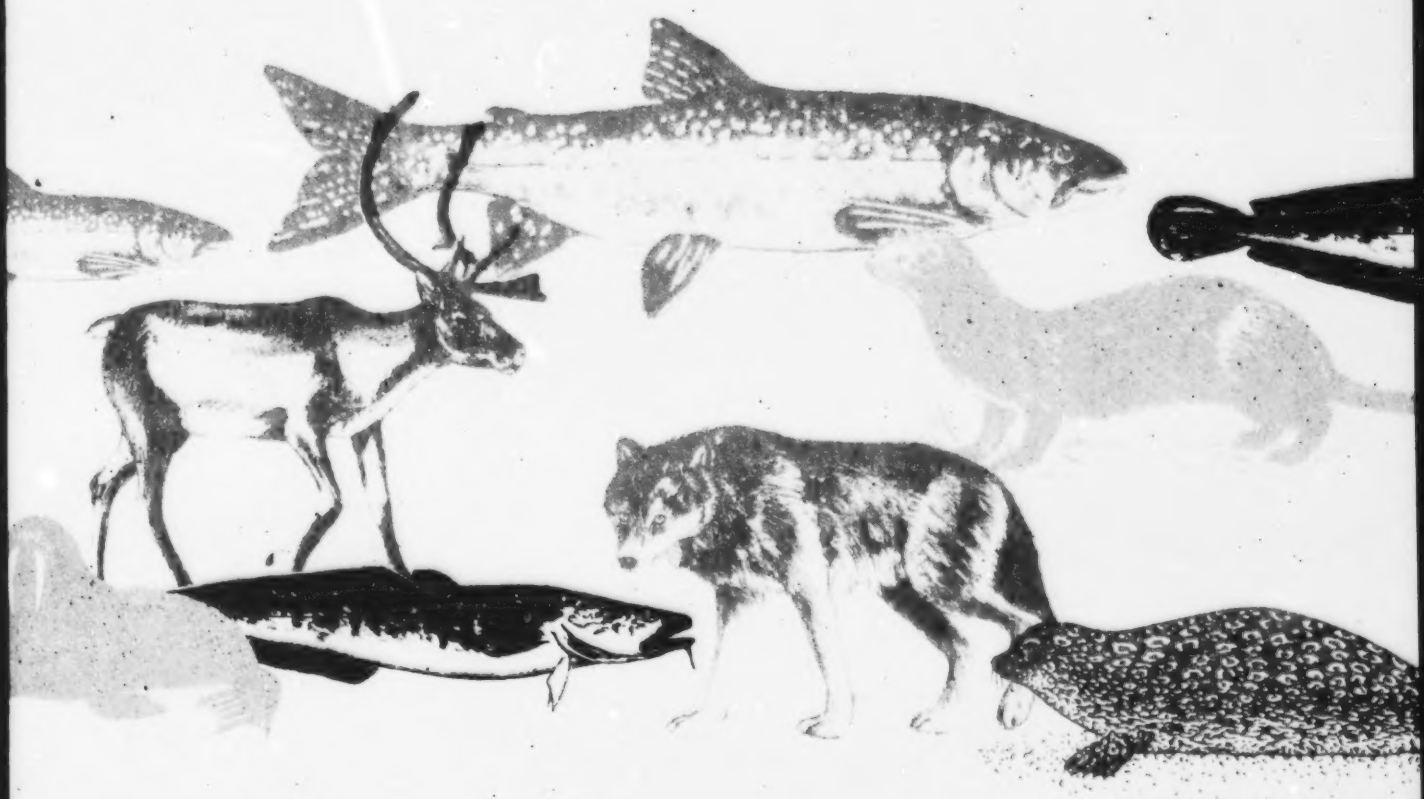
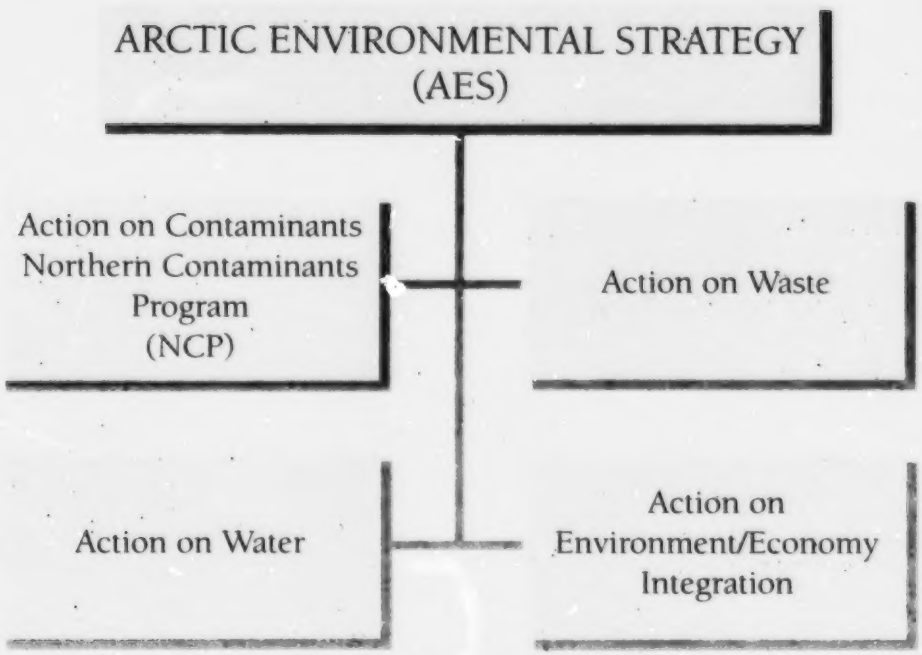
# Contaminants in Northern Canada

*Arctic Environmental Strategy:*
*Northern Contaminants Program*






AES: Organization Chart

*he Arctic Environmental Strategy (AES) is an environmental action plan to focus on concerns North of 60°. Although coordinated by the Department of Indian Affairs and Northern Development (DIAND), AES is a cooperative effort managed by the Governments of Canada, the Yukon and Northwest Territories, aboriginal organizations and communities. The aim of the Strategy is to protect the health and integrity of Arctic ecosystems and to work with circumpolar and other nations for international environmental protection agreements. It represents a $100 million, six-year initiative ending in 1996/97.*

*This booklet focuses on one component of the Strategy: The Northern Contaminants Program.*

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"The AES is an environmental action plan to focus on concerns North of 60°."

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# Introduction

*As Northerners, our relationship to the environment is usually closely linked with our personal life styles and that of the cultural group to which we belong. One of the most important values is respect; respect for yourself, for others and for the environment. Many of our northern traditions and legends revolve around food gathering and eating. These respected traditions helped to preserve the balance between us and the environment. Traditional northern foods are particularly important because of their superior nutritional value and their special spiritual and cultural significance. As well, traditional harvesting is an important economic factor in many northern communities. The stated objective of the Northern Contaminants Program is to reduce and, wherever possible, get rid of contaminants in traditional food. The result of this program should be renewed confidence in these foods as a safe diet.*

In the last decade, there has been more and more evidence that the North, which doesn't have a lot of pollution sources of its own, is collecting chemical contaminants released elsewhere on the Earth. Contaminants from industry and agricultural practices travel to the North by natural processes. In 1991, the Northern Contaminants Program (NCP) began to look at the problem in Canada, and to try and answer some important questions, such as:

- What Are Contaminants?
- Where Do Contaminants Come From?
- How Do Contaminants Get To The North?
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Under the Arctic Environmental Strategy (AES): Northern Contaminants Program, scientific studies are trying to find answers to these questions.

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# What Are Contaminants?

*A contaminant is a substance that is found in a place where it should not be. This does not necessarily mean that it is harmful, but depending on what it is and the amount that is present, it may be. The contaminants of priority concern for this program are organochlorines, metals and radionuclides.*

*Organochlorines* *Metals* *Radionuclides*

*Contaminant particles are often so small that you cannot see them or even smell them. Because it is hard to visualize something that you can't see or even smell we use icons to represent the priority groups of contaminants.*



*Organochlorines*

*Organochlorines* are manufactured chemicals; they do not occur naturally. Often they are pesticides or products from industrial processes, old electrical components or they are released from burning garbage. Some examples of organochlorines are DDT, PCBs and toxaphene.

*Metals*

*Metals* are elements that occur naturally in rock or soils. Some metals are essential for life processes and cannot fall below critical levels without harm to plants or animals, but metals can also produce harmful effects at excessive concentrations. There are also some non-essential metals such as mercury, cadmium and lead, which are called "heavy metals", that are toxic to most living things, even at relatively low concentrations.

*Radionuclides*

*Radionuclides* are a variety of radioactive forms of atoms; they can be naturally occurring or result from industrial activity. Most radionuclides occur naturally at very low concentrations, but incidents such as the 1986 Chernobyl nuclear accident reveal how easily contamination of a wide area can occur.

*Industry in other parts of the world produce a lot of the contaminants that reach the Arctic.*

# Where Do Contaminants Come From?

Many of the contaminants of concern have never been used in the North, and several of them have never even been used in the rest of Canada, or are now banned or restricted. This indicates that other countries are the major sources for many contaminants found in the North.

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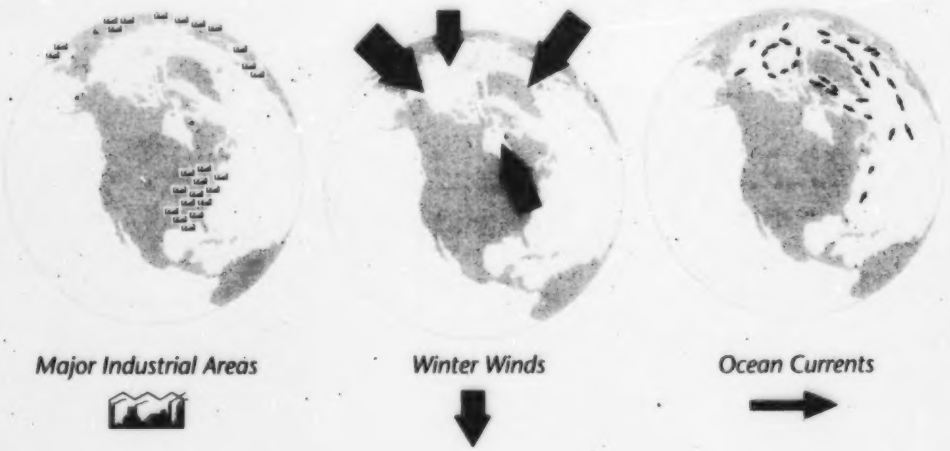
## How Do Contaminants Get to the North?

It has been found that contaminants reaching the Arctic are mainly carried in the atmosphere, as gas or particles (dust) in wind and clouds. The atmosphere is the fastest way for substances to move around the world. It may take only a few days for something released in continental Europe to reach the Arctic.

Contaminants can also be carried on ocean currents and in rivers, but in the Canadian Arctic, it appears that input from the atmosphere is much more important than input from Canadian rivers. Studies are being done on Russian rivers to see how much they contribute.




*Contaminants are a global problem. Winter winds and ocean currents carry contaminants from major industrial areas in Asia, Europe and eastern USA to the Arctic.*

There may also be local sources such as old Distant Early Warning (DEW) line sites and garbage dumps, but they are not the cause for the widespread occurrence of contaminants in the Arctic. The AES Action on Waste Program is working to identify and clean up many local contaminant sources.

## Where Do Contaminants End Up Once They Reach the North?

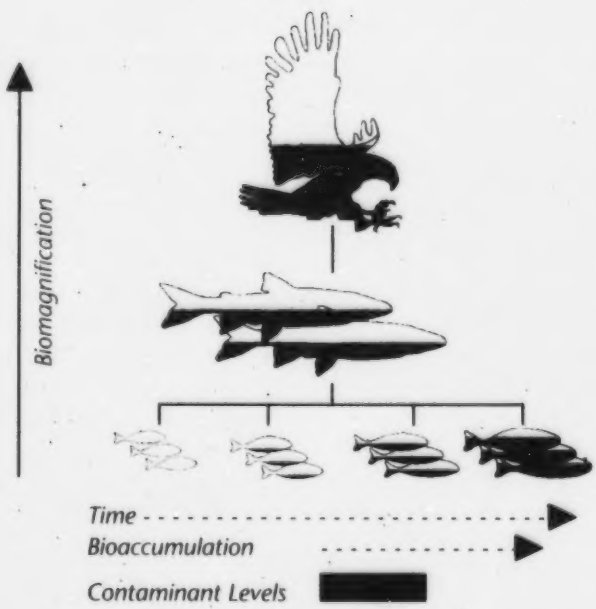
The North is polluted because the world is polluted. As elsewhere in the world, contaminants are found in air, water, soil, lakes, rivers, oceans, plants, animals and humans. Usually the amounts are so small we don't need to worry.

"The North is polluted because the world is polluted."

# How Do Wildlife Become Contaminated?

*We are only just beginning to understand the factors that influence contaminant levels in wildlife. We do know that some organochlorines do not readily break down in the environment, so temperature, time, light and bacteria cannot change them much. These kinds of contaminants do not break down when eaten by animals or people, instead they stay in the body. They are persistent. Also, organochlorines do not dissolve in water, and are attracted to fats and oils in which they can dissolve. They are fat soluble.*

When an animal eats a persistent, fat soluble contaminant, the contaminant will stay in the animal's body. It will usually be stored in the fat or in certain organs such as the liver or kidney. Contaminants usually are stored in some parts of the body, but not in others. This is why sometimes it is fine to eat meat, but not the liver or kidneys of the same animal.




***Bioaccumulation and Biomagnification of Contaminants***

*If contaminants are present in food and they are not eliminated by the body's normal waste disposal systems, they will accumulate or build up. This process is called bioaccumulation. If contaminants continue to be present in the environment and so in the food, as time goes by, more contaminants will accumulate. In this situation, older animals will have a larger accumulation of contaminants than young animals in the same situation.*

*When an animal is eaten by another animal, the contaminants that had accumulated over its lifetime are passed to the predator. The contaminants have moved up the food chain. As contaminants move up the food chain, they become magnified. This is called biomagnification. Biomagnification is increased at every step of the food chain. This means that an animal from the top of a long food chain is more likely to have high contaminant levels than an animal from a short food chain..*

Since many contaminants are stored in the body and not broken down, as an animal continues to consume contaminants, the levels in its body will build up over time. This is why sometimes it is better to eat younger animals - they have not been consuming and storing contaminants for as long, so there is less in their bodies than there would be in older animals.

Many animals use other animals for food. These animals can build up higher levels of contaminants because when they eat another animal, they consume all the contaminants that the prey has stored in its body over its lifetime.

This means that the concentration magnifies at each step from animal to animal (i.e. along the food chain). This process is called biomagnification. This is why animals such as polar bears (whose food chain includes seals, which eat fish, which eat smaller fish, which eat insects, which eat plants) have much higher concentrations than animals such as caribou (whose food chain only has one step from plants).

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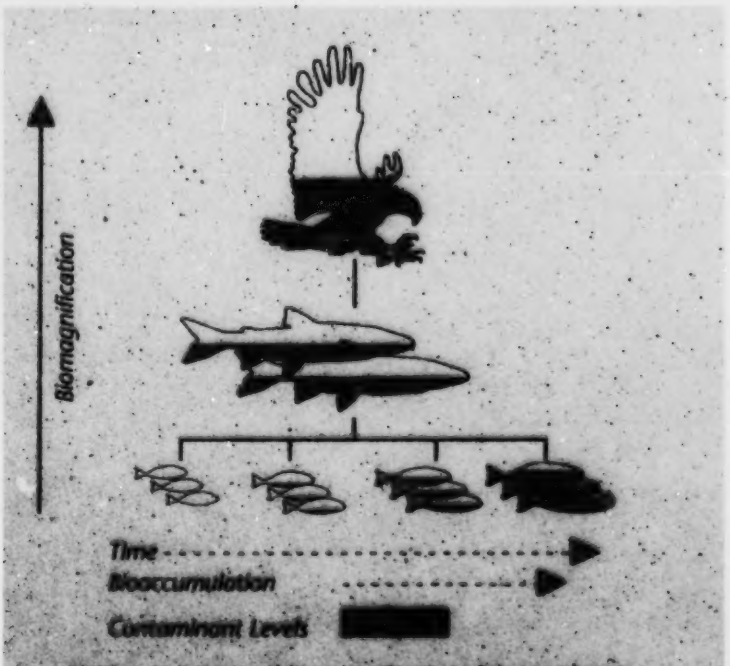


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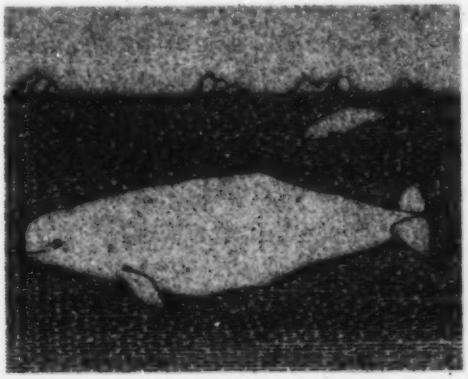
# What Are the Effects on Wildlife?

To find out more about contaminants in our wildlife, a number of different kinds of studies are going on. Some studies are just trying to measure the amount of contaminants in animals.



*Beluga whales are part of the Arctic marine food chain.*

Studies focus on the animals which are often eaten by people. This includes fish (Arctic char, burbot, lake trout...), caribou, seabirds and their eggs, seals, beluga whales, narwhal and walrus.

Polar bears and wolves are studied because, like humans, they are the highest animals in the food chain. Mink are studied because they are very sensitive to effects from certain contaminants, so they can be good biological indicators of problems with contaminants.

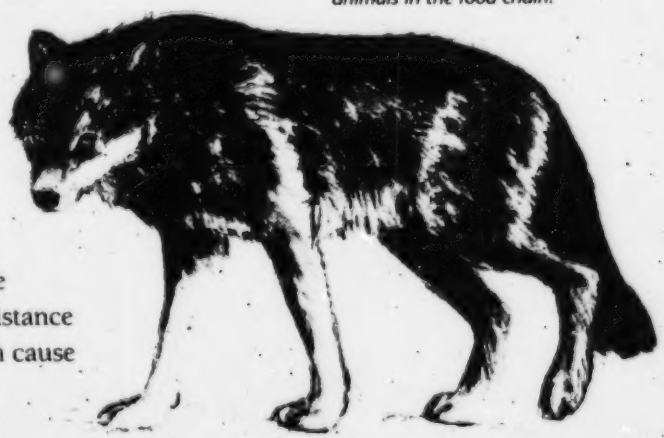
In addition to finding out how much contamination is in the animals, we are trying to discover if there are any geographic patterns - such as higher levels in certain areas of the Arctic, or particular contaminants in different areas of the Arctic. This may also help us to learn about where in the world the contaminants are coming from. We will also compare levels in the Canadian Arctic with levels around the world, and in southern Canada.

Here are some of the things that have been learned so far:

*Organochlorines*

Organochlorine contaminants such as PCBs, DDT and toxaphene can almost always be measured in the fat of animals that are part of an aquatic food chain, such as polar bears, seals and fish. Differences in the concentration or type of contaminant found in different parts of the Arctic are not large. No one region has exceptionally higher levels than the rest of the Arctic. This indicates that local sites of pollution, while having potential localized increases in contaminants, are not likely a major factor in the widespread contamination of Arctic food chains.

*Wolves are studied because, like humans, they are the highest animals in the food chain.*



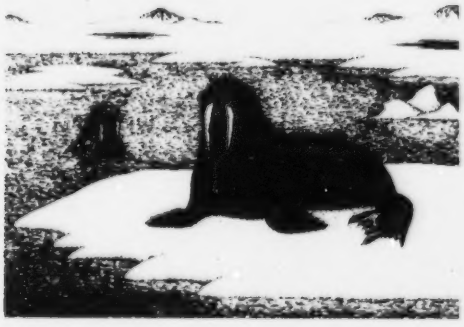
It's not known if contaminant levels are high enough to have any effects on the health of Arctic animals. So far, no changes have been reported which can be linked to contaminants. However, in more heavily polluted areas, such as the Great Lakes, the St. Lawrence River, and some of the European seas, effects of contaminants on wildlife are thought to include problems with development of young, reproduction, resistance to disease, certain types of cancer and mutations that can cause defects (e.g. crossed bills and webbed feet).

## Marine Wildlife

Polar bears, whales and seals usually have higher organochlorine contaminant levels than other Arctic animals. They are part of a longer food chain, which starts with microscopic plants and animals, krill and fish. Therefore there is more biomagnification. They are also very fatty animals with longer lives and so have more time during which to build up contaminants in their bodies.

Walrus usually have lower contaminant levels in their blubber than other marine mammals. This is because they feed mainly on mussels, and so have a shorter food chain and less biomagnification than seals, whales and polar bears.

In the Eastern Arctic, walrus have higher levels of metals such as lead and cadmium than seals. The mussels and clams in this area also have higher metal levels, and because they are a main walrus food source, are thought to be the reason for the higher metals levels in these walrus.



*Walrus feed mainly on mussels, and so have a shorter food chain and less biomagnification than seals, whales and polar bears.*

*From ringed seals to polar bears PCBs are magnified x 7*

*From Arctic cod to ringed seals PCBs are magnified x 8*

*From zooplankton to Arctic cod PCBs are magnified x 25*

*From seawater to zooplankton PCBs are magnified x 2 million*

*Biomagnification of PCBs in Marine Arctic Food Chain*

## Freshwater Wildlife

For fish, studies on a number of Yukon lakes showed that lake trout and burbot in Atlin Lake and Lake Laberge had contaminant levels that were quite high, and health advisories were issued. In other Yukon lakes, contaminant levels in fish did not pose a hazard. Researchers are trying to find out why fish in Atlin and Laberge have high levels, while fish in other nearby lakes do not. The top predators in Lake Laberge feed at a higher trophic level than other lakes. This means there are more steps in their food chains, so there is more opportunity for biomagnification of contaminant levels which could account for the higher levels of DDT and PCBs.

*Lake Trout*

In the NWT, there have been concerns about high organochlorine levels in whole walleye and burbot liver from the Slave River. More recent surveys in the east and west arms of Great Slave Lake revealed relatively low organochlorine levels which would not be a problem for consumers.

*Burbot*

*Biomagnification of PCBs in Marine Arctic Food Chain.*

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## Birds

Studies of fish-eating birds, such as gulls, show that many have high contaminant levels in their eggs and their bodies. However, because they often migrate to the Arctic from contaminated areas in the South, it is not possible to tell where these birds picked up most of their contaminants. It is known that non-migratory species such as ptarmigan are much "cleaner", in terms of contaminant levels. Birds that migrate are usually exposed to greater levels of contamination at southern latitudes.

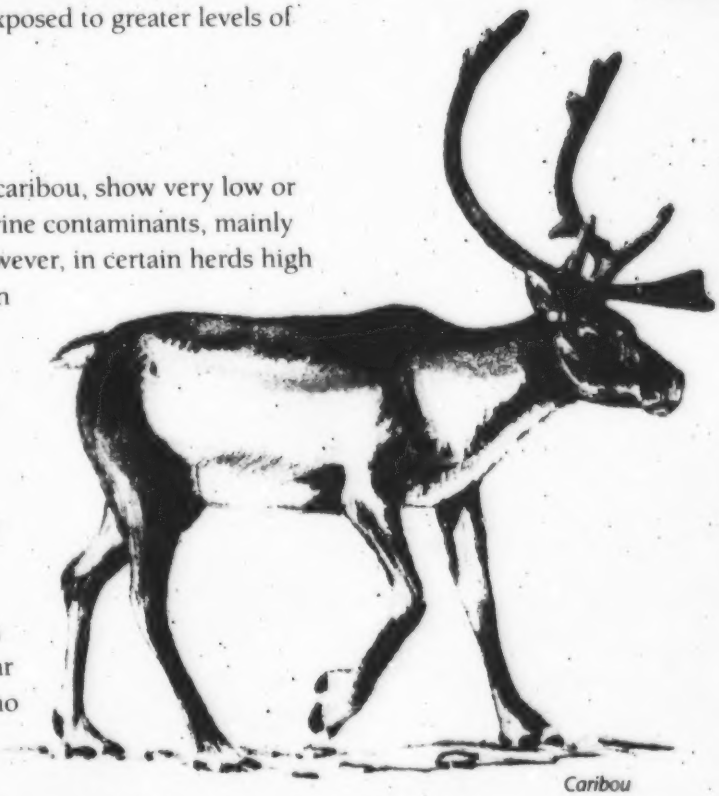
## Land Animals

*Metals*

Studies of land animals, such as caribou, show very low or undetectable levels of the organochlorine contaminants, mainly because of their short food chain. However, in certain herds high levels of the metal cadmium have been measured in the caribou kidneys. Cadmium accumulates over a period of time, so that the highest concentrations are found in the kidneys of older animals. This is an example of bioaccumulation of cadmium.

*Radionuclides*

In past years, radioactivity was a concern. Although there are natural sources, especially in the NWT, environmental levels have gone down significantly since atmospheric nuclear weapons testing was stopped. There are presently no major human health concerns related to radioactivity in caribou.



*Caribou*

Wolves are being studied because they are at the top of the land-based food chain, feeding on caribou and small mammals that eat plants such as lichen and moss.

Mink are another animal being studied. Studies in more polluted areas have shown that they are highly sensitive to organochlorine contaminants, and will have reproductive problems from consuming contaminants at the levels found in Great Lakes fish.

The Arctic is much less contaminated than the Great Lakes, and no such effects have been found in mink in the Territories. The levels measured in wild mink in the North are low to undetectable.

*Mink*

*Mink are studied because, like humans, they are very sensitive to effects from certain contaminants, so they can be good biological indicators of problems with contaminants.*

## What Does This Mean for Human Health?

***People may be exposed to contaminants through a variety of sources, including food, water, air, soil or consumer products. Food is usually the main source, although some people are directly exposed at work (mostly in the South), for example, people in mining and smelting operations, workers in chemical plants, and farmers using pesticides. This is called occupational exposure and is usually much higher than anything the average person would be exposed to through the environment.***

In the North, people who live off the land and sea can have a much healthier diet than people who do not. "Traditional" foods are often more nutritious than many store-bought foods, and children raised on a traditional food diet generally have a better chance of being bigger, stronger and healthier. One of the reasons is that eating a wide range of traditional foods provides a balanced diet, and this is important to good health, whether it is traditional food or store-bought. Adults who eat a lot of traditional foods usually have more protection against heart attack and stroke than adults who do not. Personal habits such as smoking, alcohol or drugs can increase risks for heart attack, stroke and cancer in adults. They can also increase risks of poor health in children and newborn babies. Cigarettes are a major source of cadmium.

Because many people in the North live off the land and sea, they are generally at the top of a longer food chain than people who do not live off the land. Every additional animal link in the food chain means more contaminant accumulation and greater concentrations at the top of the chain. This is the main reason why seals, whales and polar bears (with longer food chains) have higher contaminant levels than caribou (with a short food chain).

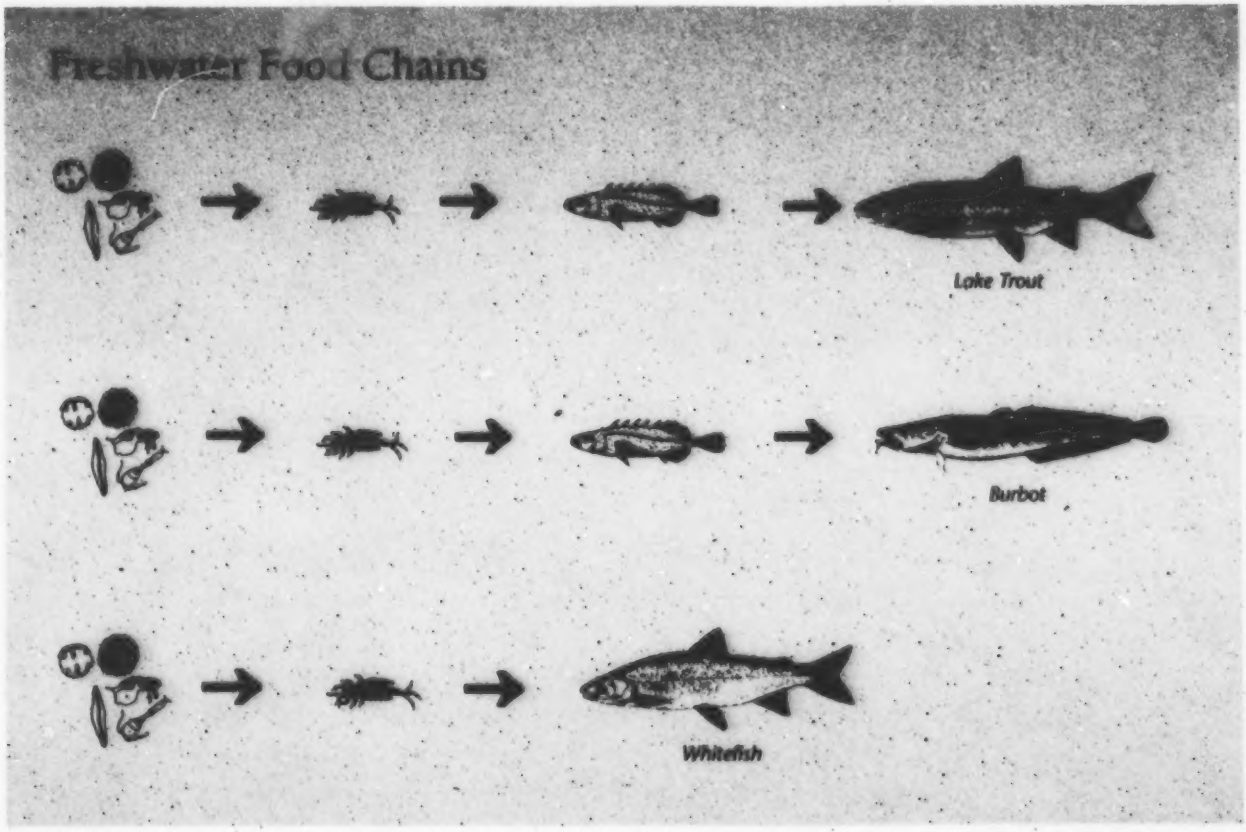
"Adults who eat a lot of traditional foods usually have more protection against heart attack and stroke than adults who do not."

## Is Traditional Food Safe to Eat?

Some people think that just because animals are being studied, there must be something wrong with them, and they are not safe to eat. This is usually not true. You have to use your own good common sense to judge if food is safe to eat. You cannot tell by sight or smell if the food contains high levels of organochlorines, metals or radionuclides. Do remember this, most northern, traditionally harvested foods are more nutritious than southern, store-bought foods. Food preparation techniques can lower contaminant rates. For example, broiling meat or fish can reduce the fat content of food more than by frying the food. Because organochlorines are stored in fat, less fat means less exposure to these contaminants. The Centre for Nutrition and the Environment of Indigenous Peoples (CINE) is studying food preparation techniques for traditional food, to make people aware of today's healthy choices.

To find out how much contaminant exposure people get from the foods they eat, from habits such as smoking and if this might cause health risks, is a very

complex process. It involves dietary surveys, food sampling and laboratory testing followed by a Health Risk Assessment. Research continues to be done to answer our questions regarding the safety of our food supply. The results of this research will be used in health assessments and studies of health effects, which are described in the next pages. Good communication of the results will help people to understand and make decisions about the food they eat.




*Lake trout and burbot are fish eaters, but whitefish feed lower on the food chain. This means that there is less opportunity for biomagnification of contaminants in whitefish than in lake trout or burbot.*

## Dietary Surveys

Dietary surveys are part of the process that helps us find out what foods people eat, and how much. They are done using interviews and questionnaires, and by asking for advice from elders and community health workers. The results may be used in Health Risk Assessments.

Information from dietary studies also helps us to show other countries how important it is for animals that are part of the traditional food diet (and therefore all plants and animals in the food chain) to be uncontaminated. By helping other countries understand how important this issue is for humans, we can start to convince them to reduce their production, use and release of the contaminants.

## What Does This Mean for Human Health?

***People may be exposed to contaminants through a variety of sources, including food, water, air, soil or consumer products. Food is usually the main source, although some people are directly exposed at work (mostly in the South), for example, people in mining and smelting operations, workers in chemical plants, and farmers using pesticides. This is called occupational exposure and is usually much higher than anything the average person would be exposed to through the environment.***

In the North, people who live off the land and sea can have a much healthier diet than people who do not. "Traditional" foods are often more nutritious than many store-bought foods, and children raised on a traditional food diet generally have a better chance of being bigger, stronger and healthier. One of the reasons is that eating a wide range of traditional foods provides a balanced diet, and this is important to good health, whether it is traditional food or store-bought. Adults who eat a lot of traditional foods usually have more protection against heart attack and stroke than adults who do not. Personal habits such as smoking, alcohol or drugs can increase risks for heart attack, stroke and cancer in adults. They can also increase risks of poor health in children and newborn babies. Cigarettes are a major source of cadmium.

Because many people in the North live off the land and sea, they are generally at the top of a longer food chain than people who do not live off the land. Every additional animal link in the food chain means more contaminant accumulation and greater concentrations at the top of the chain. This is the main reason why seals, whales and polar bears (with longer food chains) have higher contaminant levels than caribou (with a short food chain).

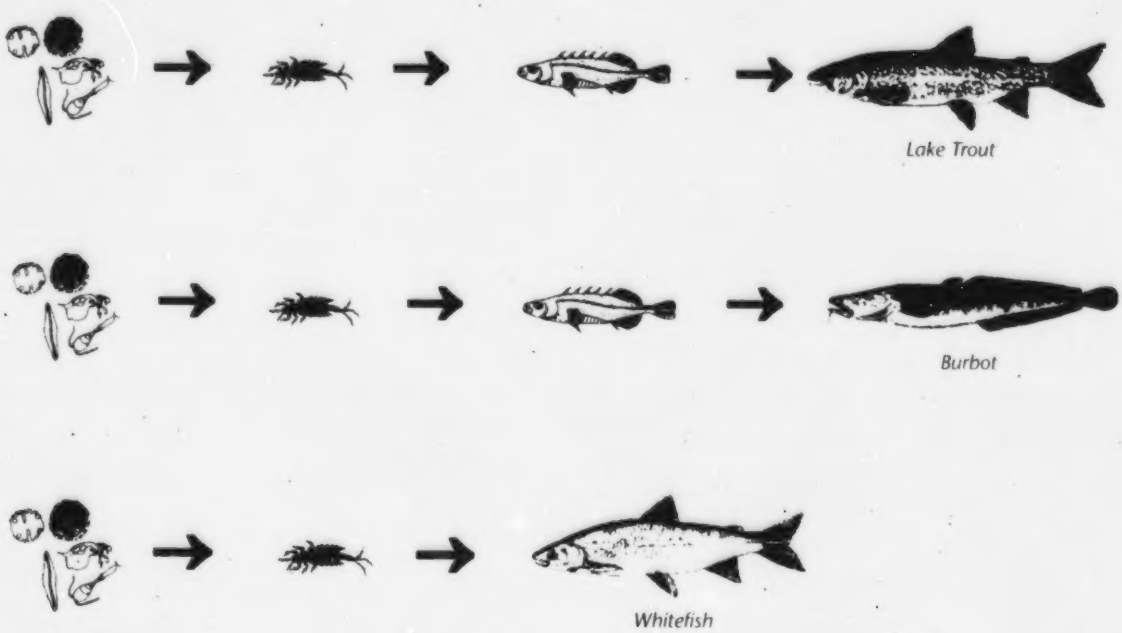
## Is Traditional Food Safe to Eat?

Some people think that just because animals are being studied, there must be something wrong with them, and they are not safe to eat. This is usually not true. You have to use your own good common sense to judge if food is safe to eat. You cannot tell by sight or smell if the food contains high levels of organochlorines, metals or radionuclides. Do remember this, most northern, traditionally harvested foods are more nutritious than southern, store-bought foods. Food preparation techniques can lower contaminant rates. For example, broiling meat or fish can reduce the fat content of food more than by frying the food. Because organochlorines are stored in fat, less fat means less exposure to these contaminants. The Centre for Nutrition and the Environment of Indigenous Peoples (CINE) is studying food preparation techniques for traditional food, to make people aware of today's healthy choices.

To find out how much contaminant exposure people get from the foods they eat, from habits such as smoking and if this might cause health risks, is a very

complex process. It involves dietary surveys, food sampling and laboratory testing followed by a Health Risk Assessment. Research continues to be done to answer our questions regarding the safety of our food supply. The results of this research will be used in health assessments and studies of health effects, which are described in the next pages. Good communication of the results will help people to understand and make decisions about the food they eat.

## Freshwater Food Chains

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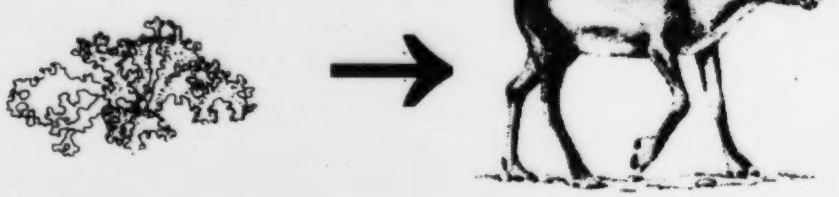
Since animals store contaminants in different parts of their bodies, researchers need to know what parts of the animals are eaten by people. For example, if the most contaminant is stored in the liver, and not much in the rest of the body, and measurements and assessments show that the liver is safe to eat, then the meat will also be safe. On the other hand, even if the contaminant levels in the liver are too high, the meat could still be okay since less contaminant would be stored there than in the liver. In such a case, measurements and an assessment would be done on the meat to check this.

## Caribou Food Chain

*Caribou have a short food chain, so there is little opportunity for biomagnification. There has been some concern about cadmium in caribou, but it is usually confined to the kidneys. The meat will not be contaminated. If you are concerned about cadmium, your best choice is to eat caribou meat because it is nutritious, and don't eat the kidneys. If you smoke, an even better choice would be to stop smoking because cigarettes are a major source of cadmium.*



### Food Sampling and Laboratory Testing

Samples of fat, meat or organs of wildlife that are eaten by northern people are collected, usually with the help of local hunters, trappers and fishermen. The samples are analyzed in specialized laboratories to determine the levels of contaminants (there are only a few places in all of Canada that have the equipment and expertise to deal with the contaminants of concern in the North). The results can then be used in Health Risk Assessments.

### Health Risk Assessments

Health Risk Assessments (HRA) are done on a case-by-case basis when people are concerned about any of the following:

- when food looks, tastes or smells different, or when the animals look unhealthy.
- when people get sick and food is the suspected cause.
- when an accident (e.g. spill) occurs.
- when levels of contaminants in the environment (including animals) are higher than usual.

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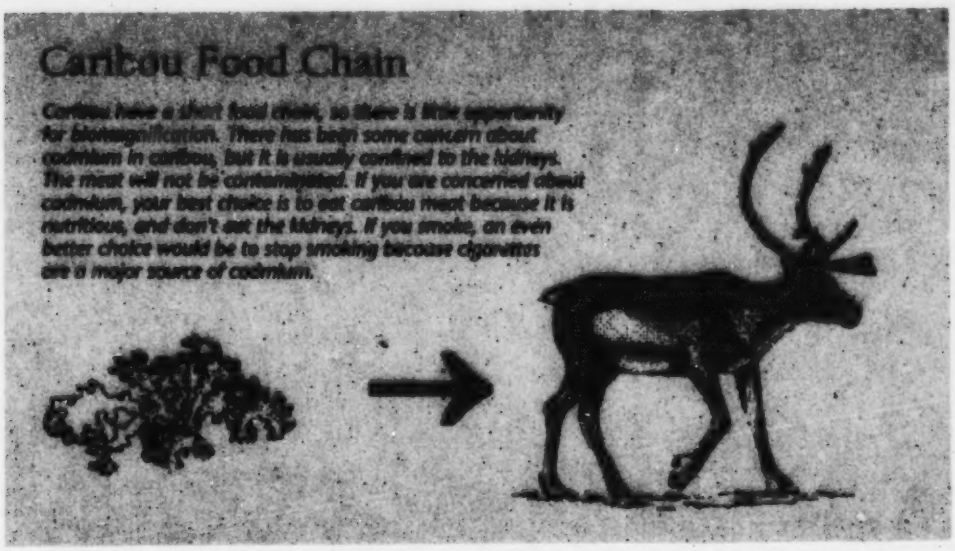
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Anyone can request that a Health Risk Assessment be done, but most often it is the health or renewable resource departments that do so. In the Yukon, requests are often likely to go through the Yukon Contaminants Committee. In the NWT, requests usually go through the GNWT Department of Health and Social Services. Health protection people at the territorial or federal level will then examine the case to decide if it is necessary to do an assessment. Health Risk Assessments are done by staff of the Health Protection Branch of Health Canada for food-related assessments. An assessment can take from a few days to a few years, depending on the amount of data available. For environmental contaminants, the assessment usually takes a long time.

The results of an HRA go back to the agency that requested the assessment. If the results show that there might be a problem, advice would be offered, to tell people what amount is safe to eat, or they may be advised not to eat certain foods, but this would be an extreme case.

In general, it is hard to prove that a particular environmental contaminant has caused a particular adverse health effect because:

- contaminant levels in the environment are relatively low.
- contaminants occur in mixtures in the environment.
- effects are not always obvious (i.e. a person might get colds more often or their baby might be smaller than average).
- there are many other factors (smoking, alcohol, drugs, nutrition, etc.) that can cause health effects.

**"Everyone in the world has some contaminants in their body, because contaminants are everywhere."**

It is not possible to tell which one is to blame, or if the effect is caused by several factors working together. Everyone in the world has some contaminants in their body, because contaminants are everywhere. Depending on our lifestyle choices such as what we eat and drink and whether we smoke, the type and amount of contaminants in our bodies varies. So, we have to take some personal responsibility for the effects that individual lifestyle choices have on our health, which in some cases pose a much greater health risk than exposure to contaminants in traditional food.

## Reasons for Concern

There are many factors that affect risk, and not much is known about the effects on humans (or animals) exposed to low levels of different contaminants over long periods of time (chronic exposure). However, from studies throughout the world we do know that:

- certain contaminants have effects at very high levels, such as in accidents or poisonings (acute exposure).
- because of bioaccumulation and biomagnification, certain contaminants can build up to high levels in humans and animals over time, even if levels in the surrounding air and water are very low.

*Organochlorines*

Metals

Radionuclides

- people exposed over a long time to high levels of certain ones of these contaminants (occupational exposure, much higher than normal environmental levels but lower than acute accidental exposure) can show health effects.
- animals in areas with relatively high environmental levels of these contaminants (such as in the Great Lakes, St. Lawrence River, North Sea and Baltic Sea) often have more health effects than animals from less contaminated areas.
- some studies on the Great Lakes show that the children of women who eat a lot of fish (from areas with relatively high environmental levels of certain contaminants) seem to have effects on their birth size and on their learning ability, but there are still a lot of questions about these results.

## What Is Being Done About the Problem?

Caribou

Walrus

Ringed Seal

Burbot

Lake Trout

***here have been quite a lot of measurements made of various contaminants in some fish and animals in the North. These measurements are the first step in evaluating the situation, and is a procedure known as exposure assessment. There is currently an exposure assessment underway in some regions of the NWT. This work is being guided by regional consultation working groups, to ensure that the purpose and the process of this monitoring activity is understood by participants and communities. To find out the levels of contaminants in people, you may be asked to volunteer samples of hair or blood.***

So far there are not many studies looking for effects of contaminants in Northern people. In northern Quebec, work has been done to see if there are differences in health and size of newborns and children. What we do know for certain, is that babies who are breastfed have a better chance of being stronger, bigger and healthier than those who are not. It is also known that children and adults who eat a lot of traditional food are usually healthier and have more protection against certain diseases than people who do not.

Many people ask: *"What is there to worry about if there are contaminants in food, but the food is still safe to eat, especially if it is healthier to eat the food than not to eat it?"*

Only in recent years have people begun to recognize that contaminants eaten by an adult, and having no effect on the adult, may be transferred to, and may have effects on, the young. There is, therefore, concern that contaminant exposure in the present generation could have effects on future generations. Presently, the benefits of eating traditional food are greater than the risks from contamination of that food. The pollution that is coming into the North needs to be stopped so that this continues to be the case.

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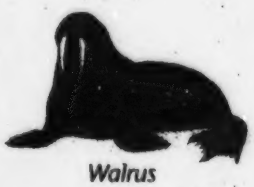

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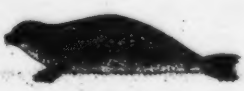

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## Centre for Nutrition and the Environment of Indigenous Peoples (CINE)

CINE is a research centre, located at McGill University, that specializes in studying nutrition and the environment of indigenous peoples. Northern aboriginal organizations are represented on the board of governors. This means that CINE represents significant scientific capabilities that are available to aboriginal organizations. Four major projects underway are:

- food use in Dene/Metis communities.
- studying the risk from cadmium in traditional food in Fort Resolution.
- the effects of preparation on organochlorines in Inuit traditional foods.
- dietary studies in Yukon communities.

CINE has developed a 3-step plan of action for responding to questions from community leaders about nutrition and the environment.

*Centre for Nutrition and the Environment of Indigenous Peoples.*

## Northern Contaminants Education Program

To help Northerners to make their own informed decisions about contaminants, the Métis Nation - NWT, has undertaken an initiative to develop a program of instructional materials for all Northerners. The program will integrate fully with existing NWT school curricula and Arctic College Adult Education Programs. The program will also be made available to the Yukon and other Northern jurisdictions.

## International Sources, International Action

Because many pollutants enter the Canadian Arctic from other countries, it is necessary for Canada to work with international organizations to develop international agreements for control of the pollutants in the source countries.

A demand for international action must be supported by:

- evidence of which contaminants are found in the Arctic.
- evidence that the contaminants come form global sources.
- evidence about the location of possible source areas.
- evidence that there is a reason for concern.

The research described above will give the needed evidence.

Canada is involved in work with the United Nations Economic Commission for Europe, and also with the other polar countries (through the circumpolar Arctic Environmental Protection Strategy).

**"It is also known that children and adults who eat a lot of traditional food are usually healthier..."**

## Arctic Monitoring and Assessment Program (AMAP)

This is a program that monitors the levels and assesses the effects of pollutants in the Arctic environment. AMAP is part of the Arctic Environmental Protection Strategy in which all eight Arctic countries are participants. Through AMAP, Canada is involved in international efforts to reduce contaminant levels.

# How Can I Find Out More About the Northern Contaminants Program (NCP)?

## Arctic Environmental Strategy (AES): NCP Projects

Brief scientific summaries of research projects, conducted under AES: NCP, are published annually. To date the published journals are:

1. Synopsis of Research Conducted Under the 1990/91 Northern Contaminants Program. *Shearer, R.G.* (Ed) DIAND 1991.
2. Environmental Studies No. 68. Synopsis of Research Conducted Under the 1991/92 Northern Contaminants Program. *Murray, J.L. and R.G. Shearer* (Eds) DIAND 1992.
3. Environmental Studies No. 70. Synopsis of Research Conducted Under the 1992/93 Northern Contaminants Program. *Murray, J.L. and R.G. Shearer* (Eds) DIAND 1993.
4. Environmental Studies No. 72. Synopsis of Research Conducted Under the 1993/94 Northern Contaminants Program. *Murray, J.L. and R.G. Shearer* (Eds) DIAND 1994.

In late 1995, an abbreviated "layperson's" version should be available.

"Brief scientific summaries of research projects... are published annually."

## NIN (Northern Information Network)

NIN, a part of the AES, is a directory of databases concerning northern information, both scientific and traditional. Two projects currently disseminate the system to users.

- On-line access allows users to access and use NIN directly by modem at 819-997-0840.
- The NIN bulletin board allows users limited time, toll-free access via 1-800-567-6935.

The bulletin board is used for downloading the NIN directory. In addition it provides an opportunity to ask questions, share information about AES projects, and read reports on current issues. For more information, please contact:

NIN Administrator
DIAND, Ottawa, Ontario K1A 0H4
Tel: 819-997-7281 Fax: 819-953-2590 BBS: 1-800-567-6937

## Aquatic Food Chain Database

This database contains results from studies of contaminants in animals in the Arctic aquatic food chain for the Yukon, NWT, the Hudson and James Bay basins, northern Quebec (Nunavik) and Labrador. There is also data from Greenland. For more information, contact:

Helene Careau
Groupe Environment Shooner Inc.
Tel: 418-623-2010 Fax: 418-623-2434

## Métis Nation Northern Contaminants Program Database

This database contains information about all NCP projects and Health Risk Assessments. For more information, contact:

Contaminants Coordinator, Métis Nation-NWT
Box 1375, Yellowknife NT X1A 2P1
Tel: 403-873-3505 Fax: 403-873-3395

## Aboriginal Organizations

The following aboriginal organizations have an AES representative. For more information, call:

| | | |
|---|---|---|
| Council for Yukon Indians | Tel: 403-667-7631 | Fax: 403-668-6577 |
| Dene Nation | Tel: 403-873-4081 | Fax: 403-920-2254 |
| Inuit Circumpolar Conference | Tel: 613-563-2642 | Fax: 613-563-3089 |
| Inuit Tapirisat Canada | Tel: 613-238-8181 | Fax: 613-234-1991 |
| Métis Nation - NWT | Tel: 403-873-3505 | Fax: 403-873-3395 |

## CINE

For further information, contact:

Centre for Nutrition and the Environment of Indigenous Peoples (CINE)
MacDonald Campus of McGill University
21, 111 Lakeshore Road, Ste-Anne-de-Bellevue, Quebec H9X 3V9
Tel: 514-398-7544 Fax: 514-398-1020

"...AES project leaderss are required to contact community leaders..."

## Government

Government departments that can provide more information:

| | |
|---|---|
| DIAND AES HOTLINE | 1-800-661-0827 |
| YTG Contaminants Committee | 403-667-3219 |
| GNWT Renewable Resources, Environmental Protection | 403-873-7654 |
| GNWT Health and Social Services, Environmental Health Division | 403-873-7313 |
| Regional Health Boards/ Services in the NWT | *See local listings in telephone directory.* |

## Individual Scientists Working in Your Community

According to the AES Contaminants Program "Guidelines for Responsible Research", AES project leaders are required to contact community leaders, national, regional and/or local aboriginal organizations and the community health representative (for health-related projects) or the local Hunters and Trappers Association (especially where animal samples are involved). The researcher should provide information about their project and, if requested, provide an opportunity for community members to ask questions and give suggestions.

Produced by the
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for the
Northern Contaminants Program

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Germaine Arnaktauyok
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